Journal of the Arkansas Academy of Science

Volume 55 Article 7

2001

Distribution and Status of Ophiogomphus westfalli (Ondonata: Gomphidae) in Missouri and Arkansas

George L. Harp
Arkansas State University

Linden Trial
Missouri Dept. of Conservation

Distribution and Status of *Ophiogomphus westfalli* (Odonata: Gomphidae) in Missouri and Arkansas

George L. Harp*
Department of Biological Sciences
Arkansas State University
State University, AR 72467

Linden Trial
Fish & Wildlife Res. Center
Missouri Dept. of Conservation
1110 South College Ave.
Columbia, MO 65201

*Corresponding Author

Abstract

Ophiogomphus westfalli is endemic to the Interior Highlands (Ozark Plateaus and Ouachita Mountains), in Missouri, Arkansas and southeastern Kansas. First described in1985, its life history is still little known. Prior to 1997, this species was known from only six sites in Missouri and 10 in Arkansas. From late May through late July in both 1999 and 2000 we surveyed 49 sites, three of them twice each, on Missouri Ozark streams in order to further clarify the distribution and relative abundance of this dragonfly. Adults, nymphs and/or exuviae were found at 23 sites. Literature and museum searches bring to 72 locations in Missouri and 10 in Arkansas where this species has been found. Small to moderate-sized populations, restricted to the Interior Highlands, are known from at least 82 locations. Therefore, it is recommended that its global and Missouri rankings be changed from G2 and S2 to G3 and S3, respectively. Distribution and abundance of this species needs further study in Arkansas.

Introduction

Ophiogomphus westfalli (Westfall's snaketail dragonfly) was described by Cook and Daigle (1985) from specimens collected in Arkansas and Missouri. It characteristically inhabits second- to fifth-order streams throughout the Interior Highlands (Fig. 1). Nymphs typically burrow in sand/gravel substrates. Upon emergence, the teneral individuals move away from the stream into nearby clearings, such as old fields, until their bodies harden and the reproductive systems mature. Here, they perch on low vegetation. Mature males return to the stream where they characteristically perch on gravel bars, streamside emergent vegetation or dead twigs. Males also periodically patrol at the head of clearly delineated riffles, watching for females returning to the water for mating and subsequent oviposition (Needham et al., 2000; Dunkle, 2000). The species is currently classified globally as G2 and in Missouri and Arkansas as S2.

Description of the Area.--The Interior Highlands are a broad geographic region lying within Arkansas, Missouri, extreme eastern Oklahoma and southeastern Kansas. The Highlands were formed by uplifting, folding and faulting processes during the Pennsylvanian Period, approximately 300 mya. Elevation ranges from 80 to over 900 m. The Highlands include two divisions, the larger northern Ozark Plateaus Physiographic Province and the smaller southern Ouachita Mountains Province (Robison and Buchanan, 1988).

The Ozark Plateaus are characterized by rugged, flat-topped mountains, long, deep valleys, steep cliffs and ledges, and clear, spring-fed streams. Principle geologic formations include Ordovician limestone and dolomite, Pennsylvanian sandstone, and Pennsylvanian and Ordovician shales. Soils are primarily residual, and vegetation is mostly upland hardwood forests of white oak, red oak and hickory (Robison and Buchanan, 1988). While limestone and dolomite often impart great alkalinity to the water, a wide range of both alkalinity and water hardness has been recorded.

The Ouachita Mountains are a series of long, narrow ridges with east-west axes. The ridges are separated by wide valleys, each drained by a river or stream. Principle geologic formations in this province are Paleozoic sedimentary sandstone and shale ranging in age from Cambrian or Ordovician through Pennsylvanian, which were warped, twisted and folded under tremendous pressure. Soils are derived from shale and sandstone, with recent alluvium in the bottomlands of the main rivers. Shortleaf pine, upland hardwood and bottomland hardwood forests predominate (Robison and Buchanan, 1988). Water hardness, alkalinity and pH all tend to be lower in Ouachita streams than in those of the Ozark Plateaus.

Methods

Forty-nine sites on Missouri Ozark streams were surveyed for adult Westfall's snaketails and associated odonate species, three of them twice. Sampling was conducted from late May through late July in both 1999 and 2000. Locations

were typically first selected from maps, based upon stream size and accessibility. Approximately two to three hours were devoted to the visual search for dragonflies at each site. Stream banks, gravel bars and nearby open areas (e.g. old fields) were examined along and to either side of an axis approximating 400 m along the stream bed. Typically, one voucher specimen was collected of each species observed. Sight identifications were occasionally made for netted specimens which were subsequently released. Populations of *Opiogomphus westfalli* were considered to be small if only one or two, or moderate if several (five+), adult individuals were observed within the search area. At 45 of the 49 sites and at the same time adults were collected, nymphs and associated aquatic macroinvertebrates were collected by Turtox Indestructible™ dip net. Specimens from this study are deposited in the Aquatic Macroinvertebrate and Adult Odonata Collections of the Arkansas State University Museum of Zoology.

All known sources of records were canvassed. Individual collectors who provided records are Tim Vogt, Illinois State Museum; John Belshe, Central Missouri State University; Randy Sarver, Missouri Department of Natural Resources; and Jane Walker and Joe Smentowski. A Missouri Department of Conservation state-wide survey of dragonflies added several records. The University of Missouri Enns Entomology Museum contains specimens. In Arkansas, a concentrated effort made by approximately 30 members of the Dragonfly Society of the Americas yielded 65 adult *O. westfalli* from a 1 km reach during a six-hour period along the South Fork of the Spring River near Hardy on 2 June 1990.

Results and Discussion

Earliest records of *Ophiogomphus westfalli* identified it as *Ophiogomphus rupinsulensis*. Williamson's (1932) specimens from the Current River in 1930 were confirmed as *O. westfalli* by Cook and Daigle (1985). Grabau (1955) recorded a very small nymph of *O. rupinsulensis* from the Meramec River. We could not relocate this specimen in the Enns Entomology Museum collection, therefore its identification could not be verified. Harp and Rickett's (1977) records of *O. rupinsulensis* for Arkansas are for this species, as well. Their later records for snaketails (Harp and Rickett, 1985) use the correct name for the species, however. Beckemeyer and Huggins (1997) tentatively identified a nymph from Cherokee County, Kansas, as *O. rupinsulensis*. This specimen is probably *O. westfalli*, as its location is quite near the known range for this species but several hundred km from the known range of *O. rupinsulensis*.

In this study, adults, nymphs and/or exuviae were recorded at 23 of the 49 sites surveyed (Table 1). Literature and museum searches brought to 72 locations in Missouri and 10 in Arkansas where this species has been found (Figure 1, Table 2). A complete list of associated odonate species and preliminary results of the aquatic macroinvertebrate survey were reported by Harp and Trial (2000). Many new locations resulted from corrected identifications of *O. westfalli* nymphs (originally identified as *Emetogomphus designatus*) in MDC benthic samples housed in the Enns Entomology Museum. Several additional records resulted from the MDC state-wide survey of dragonflies. Locations sampled, numbers of *O. westfalli* recorded and an evaluation of the habitat suitability for this dragonfly are summarized by river basin.

Elk River Basin.--*Ophiogomphus westfalli* was found at four of the five sites surveyed. Adults were recorded on Big Sugar Creek, while nymphs were found in DNR samples from Indian and Mikes creeks. Low numbers were found, but the population appears to be widespread in this river basin. Stream turbidity was low, gradient was adequate and the substrate was appropriate for this species. The Elk River mainstem and other tributaries may support this dragonfly and need to be searched.

Spring River Basin.--The target species was recorded at five of eight sites. Moderate numbers were present in upper Shoal Creek but not at two sites downstream. Center Creek, from which nymphs were collected in 1961 (Cook and Daigle, 1985), is now quite turbid and was not sampled. The lower reaches of Spring River in Missouri show degradation from silt, making the stream more turbid than *O. westfalli* prefers. Nitrogen and phosphorus are increasing the algal blooms, which can shade lower water levels and increase biochemical demand (BOD) as these algae die. Nymphs were collected from Spring River and Shoal Creek by the MDC in 1964- 65. *O. westfalli* populations appear to be widespread but with low numbers.

White River Basin.--The populations are widespread (eight of 10 sites) but generally low in numbers. Moderate numbers were found at Flat Creek. Bryant Creek, the North Fork of White River and James River also had adults, nymphs and/or exuviae in low numbers. Adverse impacts include organic runoff and solid waste in Beaver, Bull, Roark and Swan creeks. Cattle also impact Swan Creek. As yet, these impacts apparently are not too severe, since a few *O. westfalli* adults were observed at Swan and Bull creeks. Adults were reported from Beaver Creek in 1982. Overall, populations appear to be healthy in this basin.

Black River Basin.--Several streams support small populations of *O. westfalli* (15 of 28 sites and 19 of 33 samples). This species does not appear to tolerate continuously cold streams (heavily influenced by springs), and this seems to contribute to a patchy distribution in this basin.

Small populations are widely scattered in the South Fork of Spring River above its confluence with the West Fork. The junction of these two streams was surveyed twice, since upstream populations of the South Fork are known and good populations exist on the South Fork further down-

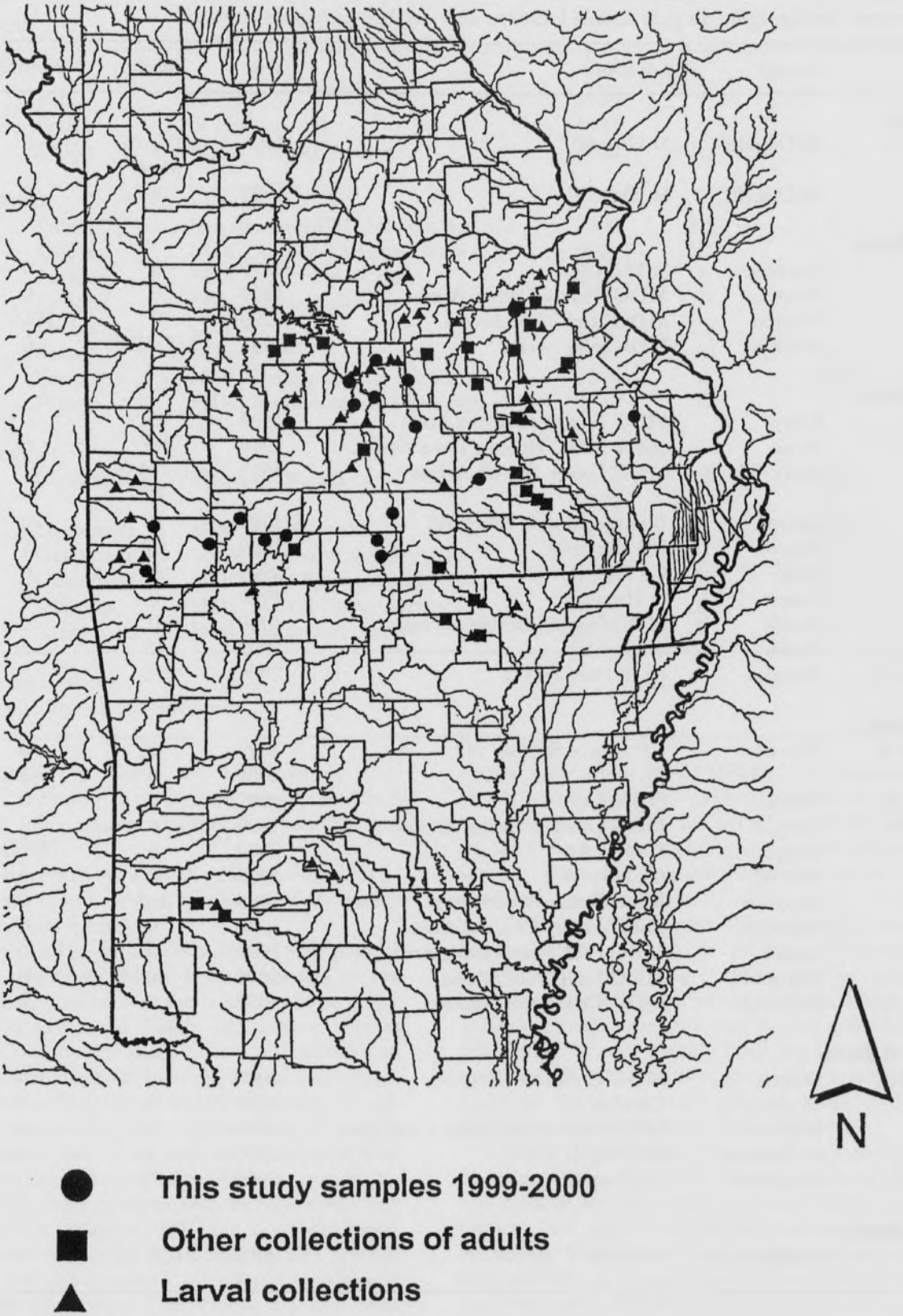

Fig. 1. *Ophiogomphus westfalli* locations.

Table 1. Missouri *Ophiogomphus westfalli* sample locations and voucher specimens collected.

Stream	County	Location	Year	Adult	Nymph	Exuviae
Elk R Basin						
Big Sugar Cr	McDonald	St Hwy 90	1999	♂,♀ in wheel	0	0
Indian Cr	McDonald	St Hwy 76	1999	0	0	0
Spring R Basin						
Spring R	Lawrence	St Hwy 97	1999	0	0	0
Shoal Cr	Newton	MDC Cherry Comer Access	1999	0	0	0
Shoal Cr	Newton	MDC Smack-out Access	1999	0	NBS*	NBS
Shoal Cr	Newton	MDC Jolly Access	1999	1♂, 5S**	0	0
White R Basin						
Roaring R	Barry	MDC Roaring R Cons Area	1999	0	0	0
James R	Stone	above MDC Hooten Town Access	1999	1♂	0	0
Flat Cr	Barry	MDC Lower Flat Cr Access	1999	1♂, 1♀ 5S	1	3
Roark Cr	Taney	Branson, Roark Valley Rd	1999	0	0	0
Bull Cr	Taney	US Hwy 160	1999	1♀	1	0
Swan Cr	Taney	Co Hwy AA	1999	2S	0	1
Beaver Cr	Taney	St Hwy 76	1999	0	0	0
Bryant Cr	Ozark	MDC Warren Bridge Access	1999	0	0	1
Bryant Cr	Ozark	St Hwy 95	1999	1S	2	0
No F White R	Douglas	Jct St Hwy 14/181	2000	2S	0	0
Black R Basin						
W&S F Spr R	Howell	100 m S of St Hwy 142	1999	0	0	0
			2000	0	NBS	NBS
Wm F Spr R	Ozark	St Hwy 19	1999	0	0	0
Eleven Pt R	Oregon	MDC Greer Crossing Access	1999	0	0	0
	Oregon	St Hwy 99	2000	0	NBS	NBS
	Howell	Co Hwy W	1999	0	0	0
Jacks Fork	Shannon	MDC Buttin Rock Access	1999	1♂	0	0
Rocky Cr	Shannon	MDC Rocky Cr Cons Area	1999	0	0	0
Rogers Cr	Carter	MDC Peck Ranch Cons Area	1999	0	0	0
Black R	Reynolds	MDC Lesterville Access	2000	0	0	0
W F Black R	Reynolds	MDC Centerville Access	1999	0	0	0
St Francis R Basin						
St Francis R	Wayne	MDC Coldwater Access	2000	0	0	0
	Madison	Co Hwy C	2000	0	0	0
	Madison	MDC Millstream Grdns Cons Area	2000	0	0	0
	St Francois	Co Hwy H	2000	0	0	0
Twelvemile Cr	Madison	Co Hwy C	2000	0	0	0
Castor R Basin						
Castor R	Madison	Co Hwy V	2000	1♂, 6S	0	0

Table 1. continued

Osage R Basin						
Little Sac R	Polk	St Hwy 215	1999	0	0	0
Pomme de Terre	Polk	St Hwy 32	1999	0	0	0
Niangua R	Dallas	MDC Charity Access	1999	1♂	0	0
Gasconade R Basin						
Gasconade R	Pulaski	lkm dnstrm MDC Schlicht Spr Acc	2000	1♂	0	0
	Laclede	MDC Anna M Adams Access	2000	1♂	0	0
Osage Fork	Laclede	MDC Hull Ford Access	2000	0	0	0
	Laclede	MDC Drynob Access	2000	5S	0	0
Big Piney R	Phelps	Co Hwy J	2000	2S	0	0
	Texas	St Hwy 32	2000	4S	0	0
	Texas	MDC Boiling Springs Access	1999	0	NBS	NBS
Roubidoux Cr	Pulaski	MDC Roubidoux Cr Cons Area	2000	0	0	0
Meramec R Basin						
Meramec R	Crawford	Meramec St Park	1999	1S	NBS	NBS
			2000	1♂, 5S	0	0
Bourbeuse R	Gasconade	MDC Tea Access	2000	0	NBS	NBS
	Gasconade	1.5km upstream of St Hwy 19	2000	0	0	0
	Gasconade	MDC Mint Spring Access	2000	0	0	0
Big R	Jefferson	MDC Merrill Horse Access	2000	0	0	0
	St Francois	MDC Leadwood Access	2000	0	0	0

* NBS=No benthic sample
** S=Sight ID only, no voucher specimen

stream, in Arkansas. The species was found neither time. The Warm Fork of Spring River was organically enriched and had much solid waste, conditions apparently not favored by *O. westfalli.*

Three sites were surveyed on the Eleven Point River. No snaketails were found, probably because of the heavy influence of numerous springs.

Current River and its tributaries support small populations (nine of 11 collections). Many of the tributaries are too small, and springs are common in this basin, resulting in few individuals at any given site. Single adults were seen at several Nature Conservancy lands. These are adjacent to Current River, which may be the source of these individuals.

The West Fork of Black River and its tributaries, though small, support a moderately large population of *O. westfalli* (two of three stations, five of six samples). A series of four MDC benthic samples collected from 1969-84 at one station contained 26, 21, 9 and 1 nymphs, respectively. While one adult was collected at an upper MDC site, none was found at a location downstream of the MDC sites in 1999. It is not known whether the above-pattern of collections reflects a real decline in the population. The Middle and East forks were not investigated during this study because of limited time. MDC benthic samples from Brushy and Strother creeks, both tributaries of Middle Fork, contained nymphs in the early 1980s. No snaketail adults or nymphs were found in Black River at the MDC Lesterville Access during the 2000 survey. Lead mining and gravel removal probably severely limit the snaketail population in the lower West Fork and mainstem Black River.

St. Francis River Basin.--No individuals were found on the mainstem or a major tributary, Twelvemile Creek, despite intense searching at five sites. The upper stream is strongly impacted by organic pollution, while the middle and lower reaches are impacted by lead mine drainage. One 1968 MDC benthic sample from Big Creek, a tributary of the lower St. Francis River, contained a single nymph. A snaketail population may still be there. Otherwise, no records of this species exist for this basin.

Castor River Basin.--The single site sampled on the mainstem had a moderate number of adults. The gradient was suitable and the water was clear. Farther downstream, turbidity and organic enrichment increased, while gradient decreased. Whitewater River had inadequate current with high turbidity at the two access points visited, and no samples were taken. Farther upstream this river was too small.

Osage River Basin.--Most of the streams have marginal habit for the nymphs. Gradients are generally too low and

Table 2. Known locations for *Ophiogomphus westfalli* in Arkansas.*

Stream	County	Location	Year	Adult	Nymph
Black R Basin					
S F Spring R	Fulton	10km W of Hardy	1981	1♀	
			1984	1♂, 1♀	
			1986	1♀	1
			1990	65	
			1991	1♂, 2♀	
			1993	2♂, 1♀	
Janes Cr	Randolph	St Hwy 90	1985		1
Strawberry R	Sharp	US Hwy 167	1976		1
			1990	a few	
	Izard	St Hwy 354	1988		2
White R Basin					
Long Cr	Carroll	Denver	1981		3
Caddo R Basin					
Caddo R	Montgomery	St Hwy 240	1978		1
			1980		1
		Rd (TAR?) 177	1981	4♂	
			1984	4♂, 1♀	
		Rd 8	1983	1♀	
Ouachita R Basin					
S F Saline R	Saline	1km N of Nance	1974		1
			1976		1
		US Hwy 70	1975		1

*With the exception of the Caddo R adults, all specimens are cataloged as voucher specimens in the ASUMZ. Collectors include GL Harp, PA Harp, R McDaniel, S Moulton, HW Robison, G Susanke and members of the Dragonfly Society of the Americas. The Caddo R adult records are from Cook and Daigle (1985).

the substrate contains too much silt or clay. Organic enrichment and concomitant turbidity were observed in this study. No snaketails were found on the Little Sac River. Although there is one 1975 MDC nymphal record from the Pomme de Terre River, none were found in this survey, and based on the observations of this study, the species probably no longer exists on the Pomme. Single individuals were recorded from four total collections on the Niangua and Little Niangua rivers and Wet Glaize Creek.

Gasconade River Basin.--This basin may support the largest, healthiest populations of the snaketail (15 of 18 locations, 21 of 24 samples). This species occurs along a 270 km reach of the mainstem of the Gasconade River (two sites during this study, six MDC sites). Moderate numbers of adults were also seen at two locations on the Osage Fork. MDC benthic samples from the Osage and Woods forks also contained nymphs.

The snaketail is widely distributed in the Big Piney River from west of Licking to its confluence with the Gasconade River. During this study, individuals were found at two of three sites. None was found at MDC Boiling Spring Access, probably because of the spring influence. An MDC site at the mouth of the Big Piney contained nymphs in 1974 and 1976.

No snaketails were found in the aerial survey or dip net sample at the single site on Roubidoux Creek. This stream is heavily influenced by springs.

Maries River Basin.--One DNR benthic sample taken from a site in 1971 and one MDC benthic sample taken from another site in 1975 contained 1-2 nymphs. Streams in this basin are too small where habitat otherwise favorable to snaketails occurs. Farther downstream, gradient is too low and the water is too turbid. An individual was collected in 2001, but the population in this basin is probably declining.

Meramec River Basin.--Moderate populations exist in this basin (14 of 19 locations, 17 of 22 collections). Moderate numbers were found on Meramec River within Meramec State Park, and one of us (L T) found individuals at two sites approximately 60 km upstream, as well. Other investigators have found this dragonfly in Meramec River tributaries. Courtois Creek supports moderate populations (two sites). Adults are reported for Indian and Little Indian creeks and one nymph from Goose Creek.

Two MDC benthic samples from the Bourbeuse River in 1962 contained nymphs. However, aerial surveys at three sites and dip net samples at two of those sites failed to find the species in 2000. Increased soil erosion and resulting turbidity are suspected to be the primary reason for the decline. Although there is a gravel-rock substrate, most of it is covered with a layer of silt up to 8-10 cm thick.

Big River supports a small population of snaketails, but only in the upper reaches, which are not impacted by lead mining. This species has been found periodically at MDC Bootleg Access from 1981-2000. It was not found downstream, at two locations, during this study. The population in this river may be in decline.

Distribution in Arkansas.--More data for this species have come from one site on the South Fork of Spring River west of Hardy than from any other single site. Periodically, various members of the Dragonfly Society of the Americas have collected this snaketail on the Caddo River around Amity and Glenwood. Otherwise, a few scattered records for Strawberry River at Evening Shade and nymphs from the Saline River exist (Table 2). The distribution and abundance of this species needs to be studied.

Primary Factors Influencing Distribution.--In general, *O. westfalli* is likely to be found along any undisturbed second- to fifth-order Ozark or Ouachita stream which is not heavily influenced by springs. At least moderate current and well-defined riffles are required, as are relatively clear water and sand-gravel substrate. In light of the wide range of alkalinity and pH values in Ozark streams and their relatively low values in Ouachita streams, where soils are primarily shale and sandstone, these parameters appear to be of secondary importance. Principle environmental perturbations in this snaketail's range appear to be related to agricultural activity. Clear cutting for pastures or tree harvesting increases runoff, resulting in decreased photosynthesis and concomitant diminished dissolved oxygen in the stream. Siltation decreases the available oxygen in the substrate, where the nymphs reside. Nitrogen and phosphorus enrichment from agricultural activity or municipalities increases the frequency and severity of algal blooms. These blooms can shade the lower water levels and, at their demise, can increase the BOD. Another limit to the distribution of *O. westfalli* results from lead and zinc mine drainage. This dragonfly is apparently intolerant of these heavy metals.

Associated Odonata Species.--Several species of Odonata were found in association with *O. westfalli* (Harp and Trial, 2000). Some of these (e.g. *Plathemis lydia*) are associates because they are species adapted to a broad spectrum of habitats. During this study, however, it became evident to one of us (GLH) that the occurrence of one species, *Gomphus ozarkensis*, closely paralleled that of *O. westfalli*. These species share several characteristics. For example, they are both stream-dwelling dragonflies of Family Gomphidae and are endemic to the Interior Highlands. Both species have short flight seasons and have synchronized spring emergence. Some differences are also known. *Gomphus ozarkensis* emerges about two weeks earlier than *O. westfalli*, while the latter flies approximately three weeks later. For example, O. *ozarkensis* may first emerge from mid-April (Ouachita Mountains) to mid-May (Missouri Ozark Plateaus), but on the South Fork of Spring River 10 km west of Hardy, where this species has been studied extensively, it typically first emerges around 6-10 May and flies until late June (Susanke and Harp, 1991). At this site *O. westfalli* appears about two weeks later and flies until mid- to late July. Additionally, while away from the stream, *O. ozarkensis* characteristically perches on bare ground, whereas *O. westfalli* perches on low vegetation. How these species co-exist is an interesting and potentially important question to answer for the effective management of both species.

Future Monitoring.--Unless a major perturbation disturbs a large part of the Interior Highlands, *O. westfalli* populations should continue to be healthy. The distribution of this species in several river basins is poorly known and more sampling is needed. Monitoring can most effectively be implemented at locations known to have sizeable populations, such as Meramec River in Meramec State Park, and at locations where the population may be in decline, such as in the Osage River Basin. Surveys at five-year intervals should be adequate to monitor this species.

Conclusions

Small to moderate-sized populations of *Ophiogomphus westfalli*, restricted to the Interior Highlands, are known from 82 locations, 72 of which are in Missouri. Therefore, it is recommended that its global and Missouri rankings be changed from G2 and S2 to G3 and S3, respectively. Distribution and abundance of this species in Arkansas needs further study.

ACKNOWLEDGMENTS.—Funding was provided by the US Fish and Wildlife Service and the Missouri Department of Conservation (MDC). Phoebe Harp collected the benthic samples. John Belshe, V. LaGesse, Joe Smentowski, Jane Walker and Tim Vogt have graciously given permission for their records to be used.

Literature Cited

Beckemeyer, R. J. and **D. G. Huggins.** 1997. Checklist of Kansas Dragonflies. Kansas Sch. Nat. 43:3-16.

Cook, C. and **J. J. Daigle.** 1985. *Ophiogomphus westfalli* spec. nov. from the Ozark Region of Arkansas and Missouri, with a key to the *Ophiogomphus* species of eastern North America (Anisoptera: Gomphidae). Odonatologica 14:89-99.

Dunkle, S. W. 2000. Dragonflies through binoculars: a field guide to dragonflies of North America. Oxford Univ. Press. 266 pp.

Grabau, M. C. 1955. A taxonomic study of the naiads of Missouri dragonflies (Odonata-Anisoptera). MS Thesis, Univ. of Missouri. 116 pp.

Harp, G. L. and **J. D. Rickett.** 1977. The dragonflies (Anisoptera) of Arkansas. Proc. Arkansas Acad. Sci. 31:50-54.

Harp, G. L. and **J. D. Rickett.** 1985. Further distributional records for Arkansas Anisoptera. Proc. Arkansas Acad. Sci. 39:131-135.

Harp, G. L. and **L. Trial.** 2000. Distribution and status of *Ophiogomphus westfalli* in Missouri and Arkansas. Missouri Dept. Conserv. Rept. 26 pp. + appendices.

Needham, J. G., M. J. Westfall, Jr. and **M. L. May.** 2000. Dragonflies of North America. Scientific Publishers, Gainesville, Florida. 939 pp.

Robison, H. W. and **T. M. Buchanan.** 1988. Fishes of Arkansas. Univ. of Arkansas Press, Fayetteville. 536 pp.

Susanke, G. R. and **G. L. Harp.** 1991. Selected biological aspects of *Gomphurus ozarkensis* (Westfall) (Anisoptera: Gomphidae). Advances in Odonatology. 5:143-151.

Williamson, E. B. 1932. Dragonflies collected in Missouri. Occasional papers of the Museum of Zoology, Univ. Michigan, Ann Arbor. No. 240. 40 pp.